

## Safety Culture – Glossary of Terms

**Anticipation** – The process of becoming aware of previously unanticipated events. Accident prevention is based on anticipating potential accidents. Anticipation is enhanced by three processes of mindfulness: (1) preoccupation with failure, (2) reluctance to simplify interpretations, and (3) sensitivity to operations. [Weick & Sutcliffe, p. 54]

**High-Reliability Organizations** – Organizations that consistently operate under trying and hazardous conditions, and manage to have relatively few accidents. These organizations operate in settings where the potential for error and disaster is very high. They have no choice but to function reliably because failure results in severe consequences. HRO theory holds that significant accidents can be prevented through proper management of prevention and mitigation activities. Examples of high-reliability organizations: nuclear aircraft carriers, nuclear power generating plants, power grid dispatching centers, air traffic control systems, aircraft operations, hospital emergency departments, hostage negotiating teams, firefighting crews, continuous processing firms. This term appears to have been co-invented by a Michigan team (Weick & Sutcliffe) and a Berkeley team (Roberts, La Porte and others) based on their work in the late 1980s. [Source: Weick & Sutcliffe, p. 3 and p. xiii]

**Latent Failures** – Loopholes in the system's defenses, barriers, and safeguards whose potential existed for some time prior to the onset of the accident sequence, though usually without any obvious bad effect. These loopholes consist of imperfections in features such as leadership/supervision, training and qualification, report of defects, engineered safety features, safety procedures, and hazard identification and evaluation. Most accidents originate from or are propagated by latent failures. This term was coined by James Reason. [Source: Weick & Sutcliffe, p. 13; Reason]

**Mindfulness** – The combination of ongoing scrutiny of existing expectations, continuous refinement and differentiation of expectations based on newer experiences, willingness and capability to invent new expectations that make sense of unprecedented events, a more nuanced appreciation of context and ways to deal with it, and identification of new dimensions of context that improve foresight and current functioning. Mindfulness is a pre-occupation with updating. Mindful people accept the reality of ignorance and work hard to smoke it out, knowing full well that each new answer uncovers a host of new questions. Mindfulness is exhibited by high reliability organizations through the following five hallmarks of reliability: (1) preoccupation with failure, (2) reluctance to simplify interpretations, (3) sensitivity to operations, (4) commitment to resilience, and (5) deference to expertise. [Source: Weick & Sutcliffe, p. 10 and p.42-44]

**Mindlessness** – The opposite of mindfulness. When people function mindlessly, they don't understand themselves or their environments, but they feel as though they do. Expectations go unexamined and un-updated. Early warning signs of danger go unnoticed. Changes in context go unnoticed. Outdated diagnoses of problems go unnoticed. Recipes are followed blindly. Old categories are used to guide perceptions and

new contexts are mislabeled. Operation is as if by auto-pilot. [Source: Weick & Sutcliffe, p. 43]

**Normal Accidents** – The inevitable accidents that are expected to occur in complex systems in modern society. Systems that are tightly-coupled and interactively-complex are more prone to accidents. In such systems, according to Perrow, catastrophic accidents are bound to happen. Charles Perrow, who coined this term, recognized that some organizations were unusually adept at avoiding “normal” accidents. Similarly, Weick & Sutcliffe recognize that perfection, zero errors, flawless performance, and infallible humans are unreasonable expectations, and that error and the unexpected are pervasive. [Perrow; Weick & Sutcliffe, p. 67]

**Normalization of Error** – The tendency to redefine and accept previously-unexpected anomalies over time as expected events and ultimately as acceptable risks. Diane Vaughan developed this term based on her study of the O-ring failures in the Challenger accident. In this accident, “the range of expected error enlarged from the judgment that it was normal to have heat on the primary O-ring, to normal to have erosion on the primary O-ring, to normal to have gas blowby, to normal to have blowby reaching the secondary O-ring, and finally to the judgment that it was normal to have erosion on the secondary O-ring.” [Source: Weick & Sutcliffe, p. 40; also Vaughan]

**Resilience** – The process of being mindful of errors that have already occurred and correcting them before they worsen or cause more serious harm. Resilience is related to accident mitigation. Resilience is enhanced by two processes of mindfulness: (1) commitment to resilience, and (2) deference to expertise. Organizations committed to resilience develop knowledge and skills to cope with and respond to errors, capability for swift feedback and swift learning, speed and accuracy in communications, flexible role structures, quick size-ups, experiential variety, skills at re-combining existing response repertoires, and comfort with improvisation. Such organizations move decision-making rapidly to those with the necessary expertise. [Source: Weick & Sutcliffe, p. 67-78]

**Safety** – A dynamic non-event; a stable outcome produced by constant adjustments to system parameters. To achieve stability, change in one system parameter must be compensated for by changes in other parameters, through a process of continuous mutual adjustment. [Source: Weick & Sutcliffe, p. 30-31]

**Safety Culture** – The safety culture of an organization is the product of individual and group values, attitudes, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization’s health and safety programs. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures. The term safety culture entered public awareness through the vocabulary of nuclear safety after the Chernobyl nuclear power plant explosion. [Source: Reason, p. 191-222; Weick & Sutcliffe, p. 127-128]

**System Fractures** – System failures that occur in a step-by-step manner that is analogous to how metal cracks under stress. To prevent major accidents, organizations must prevent individual errors for propagating into full-scale system fractures. [Source: Chiles, p. 7]

**Tightly-Coupled System** – A process or set of activities that has little slack in it; system in which an upset, once initiated, propagates rapidly. Coupling concerns the degree to which one part of the system directly and immediately affects other parts within the system. The degree of coupling reflects both the time component (how quickly changes are propagated) as well as the extent of propagation (the degree of interdependence). Examples of tightly coupled systems: aircraft, nuclear power generation, chemical processing. Tightly-coupled and interactively-complex systems are more prone to accidents, according to Charles Perrow, who coined these terms. [Source: Weick & Sutcliffe, p. 97]

References:

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